as a larger boat; for inſtance, on a man arriving with ſix four-ton boats *(equal to what is uſualy conveyed in a boat of twenty-five tons)* at a lock conſtructed for ſmall boats, he would be obliged to ſeparate them, and paſs them ſingly; which would be an operation of three minutes at leaſt to each boat, together with the time neceſſary for uniting them when paſſed through, ſay four minutes, amounting in all to twenty-four minutes; a repetition of this operation, to mount only one hundred feet by twelve locks, would be a delay of four hours forty-eight minutes: this would not only be tedious, but create confuſion wherever there were a number of boats paſſing, even if paſſing the ſame way. How this would be increaſed by thoſe moving the contrary way, may eaſily be conceived. Yet the twenty-five ton boat would move through the firſt lock in five minutes, at the utmoſt, and paſſing through the ſucceeding eleven locks with the ſame expedition, would riſe to the ſummit level in one hour: hence the twenty-five ton boat will have an advantage in time of three hours forty-eight minutes. This calculation, I hope, will ſufficiently prove the impropriety of conſtructing locks for ſmall boats; hence ſmall and cheap canals cannot be formed on the lock principle; locks demand large boats, that an important trade may be performed; and large boats are the cauſe of increaſing the expence of all the other parts of the canal; in tunnels, bridges, aqueducts, land, reſervoirs, digging, &c. &c. which evidently exclude every diſtrict which cannot ſupport theſe heavy expences, and preclude every hope of giving to agriculture and commerce the full force of ſo powerful an agent as water conveyance.

But as the true criterion for judging of all improvements, *where the object is to increaſe the produce of labour*, is the cheapneſs with which the work may be performed; that mode which will convey the moſt goods for the leaſt money will conſequently be the beſt, whether by roads, railways, large or ſmall canals, or any other mode. It is therefore

therefore neceſſary impartially and deliberately to inveſtigate this ſubject.

First, In proportion as a canal is large the expence on all its parts will increaſe: tunnels, locks, reſervoirs, aqueducts, bridges, land, and digging, are uſually allowed to be one third more expence in a canal for forty-ton boats, than in thoſe conſtructed for boats of twenty-five tons; twenty-five ton boats, alſo, require a canal of greater dimenſions than boats of four tons: in a word, it is evident that the expence of a canal will decreaſe, in proportion as the boats are reduced; the object therefore is to find the proper medium.

The boat ſhould be of ſuch a ſize as not to exclude any but unuſual articles; for this purpoſe I conceive a boat of four tons ſufficiently large; being twenty feet long, four wide, and two feet ten inches deep; ſuch a boat, being larger than the cheſt of a waggon, will contain almoſt every thing but long timber*, one horſe conveying ten boats.

Such boats will contain lime, lime-ſtone, coals, lead, iron ore, grain, flour, iron ware, pottery, and all bodies ponderous and compact, as well as boats of any ſize whatever; they will contain hogſheads, boxes, and bale goods, not exceeding four feet in width, *which are ſeldom of greater dimenſions*; each boat will receive fifteen ſacks of hops, cotton, or wool; and although the fifteen ſacks will not weigh four tons, yet the ſame circumſtance is attendant on all other boats, it being impoſſible to give the weight of tonnage

by

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* For timber I have made a proviſion (ſee the Deſcription of the double-inclined Plane, and Plate of Parts); planks, and all ſcantlings under twenty feet, will go into the boats.